Saskatchewan
Research Council

SASKATOON SRC
CLIMATOLOGICAL REFERENCE STATION
ANNUAL SUMMARY, 1988

by

V. Wittrock
R.M. Begrand
E.E. Wheaton

SRC Technical Report No. 222

Publication E-906-2-B-89

January, 1989

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ABSTRACT

Data concerning temperature, precipitation, soil temperature, evaporation, windspeed, bright sunshine and solar radiation at the Saskatoon Climatological Reference Station (52°09'N, 106°36'W, 497 m MSL) are presented for the year 1988 and compared with the long term historic and standard period (1951-80) records.

1988 was a year most Saskatoon area farmers would rather have been different. There was very little precipitation in the Saskatoon district from January to July (only 62% of normal). With the exceptions of March and August, every month had below normal precipitation and above normal temperatures. Several temperature extremes were equalled or exceeded during many months - both winter and summer. The temperatures were so high in June that a new record was achieved on June 5th at 41°C. This makes June 5, 1988 the hottest day recorded during the 92 year record. The old record of 40°C was recorded in 1900, 1919, and 1941. Both May and June had the highest mean monthly temperatures during the entire 92 year period of record. These high temperatures helped make 1988 the fourth warmest year during the 92 year record. Saskatoon lived up to its temperature versatility in 1988. The coldest temperature recorded was -39.5°C in February and the warmest was 41°C in June.

The number of growing degree days was 367.1 higher than normal, with the most accumulation in the hot days of June. The evaporation amount was 87.6% above normal and 25% above last year's value. The greatest evaporation rates were recorded in the May to July period. Because of the warm dry weather and poor vegetative growth, dust storms were frequent and severe. This was also the period when the most sunshine hours were recorded.

1988 will be remembered for its hot dry spring and summer. When the rain did come in August it was too late to help the agricultural sector to any great extent.

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HISTORY AND STATION LOCATION

The first meteorological observations appear to have been taken at or near Saskatoon by the Royal Northwest Mounted Police in 1889. At first only temperatures were recorded. There were a number of changes made in the coordinates and as a result there is some disagreement in the early records as to the exact location of the weather observing point. The bulk of the evidence, however, indicates that the location was 52°15'N and 106°20'W, elevation 480 m above sea level. This would place it at Clark's Crossing, on the South Saskatchewan River, approximately 16 km north and east of the centre of the present City of Saskatoon. At that time there was a settlement at Clark's Crossing and also about 10 or 15 families on either side of the river at Saskatoon.

Not too much is known about the early observers. However, the records show that a Major T.H. Keenan took the observations from March, 1892 until March, 1895. Mr. George Will was the observer from January, 1897 until April, 1897. It is thought that Thomas H. Copeland was involved in the observational program from 1895 to May 1, 1901, at which time it was taken over by Mr. Eby, senior. Continuous observations were taken by the Eby's at a site on 8th Street until October 31, 1942, when the station was closed. Mr. Eby continued the program until his death in 1921. His daughter, Miss E.S. Eby, recorded the observations until April, 1931 and was replaced by her brother, J.M. Eby, who continued the program until the station was closed. The Eby station recorded temperature, precipitation and weather notes on fog, thunderstorms, winds and any unusual weather phenomena. Reports were made twice daily, morning and evening.

In 1916 a climatological station was established by the Physics

Department of the University of Saskatchewan and continuous observations were kept twice daily until January 15, 1965. The long time observer at this site was Mr. Sidney Cox. The Saskatchewan Research Council took over the program in the fall of 1963 at our newly established Climatological Reference Station.

The location of the Saskatchewan Research Council's Climatological Reference Station is latitude 52°09'N and longitude 106°36'W and the elevation is 497 m above mean sea level*. The long time observer (16 years) at this present site was Mr. Joe Calvert, who retired from the program in August, 1983. The observers for 1988 were Ray Begrand, Rolf Jahren, Brett Smith, James Ross, Bob MacPherson, Rod Bouvier, Julio Matamala, and Virginia Wittrock.

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*From various sources including the Physical Environment of Saskatoon, Canada (E.A. Christiansen ed. 1970) and 1974 Annual Meteorological Summary, Saskatoon, Saskatchewan, Environment Canada, Atmospheric Environment Service.

FOOTNOTES TO CLIMATIC TABLES 1 TO 13

1 The values are calculated using the monthly summaries, January to December, 1988 (Tables 2 to 13).

2 In climatology it is often useful to make spatial comparisons of particular element values over a common time period. At an interior continental site such as Saskatoon, a period of 30 years is required to produce statistically stable estimates of the more variable elements. To facilitate spatial comparisons, the World Meteorological Organization currently recommends the standard normal period January 1, 1951 to December 31, 1980 for data analysis. Items in this column conform to this standard, except where noted.

3 Temporal comparisons at a point are also of value in some types of climatic studies. Therefore, it is desirable to produce the maximum length of reliable climatic record to carry out studies over a period of time. Data in this column are drawn from the following data sets:

Saskatoon SRC	1964 to 1986
Saskatoon U. of S.	1916 to 1963
Saskatoon	1892 to 1915

Station locations, exposures and measurement procedures were subject to change during this time period. Data presented in this column are unadjusted and users are cautioned accordingly.

4 The mean annual temperature is defined as the average of the daily mean temperatures for one year. In the monthly summaries (Tables 2 to 13) the daily mean temperature reported is the average of the daily mean temperatures for one month under consideration. In turn, the daily mean temperature for a particular day is defined as the arithmetic mean of the daily maximum temperature and the daily minimum temperature for the date. The normal records used for comparison purposes are those published in Volume Two of the Atmospheric Environment Service publication "Canadian Climate Normals, 1951-1980, Temperature".

5 The mean maximum temperature tabulated is the mean of the daily maximum temperatures for one year in the case of Table 1 and for particular months in the cases of Tables 2 to 13. For details concerning measurement procedures, the reader is referred to the Atmospheric Environment Service publication Manual of Climatological Observations, second edition, January, 1978. The normal values are published in Volume Two of the Canadian Climate Normals (note 4).

6 The mean minimum temperature as tabulated is defined as the mean of the daily minimum temperatures averaged over the appropriate time periods. Refer to note 5 above concerning measurement procedures and normals.

7 The word "extreme" refers to the highest or lowest value of a particular element recorded during the period in question. The highest temperature recorded at Saskatoon SRC during 1988 was 41.0°C. This becomes the new extreme as the highest value previously recorded at Saskatoon was 40.0°C (see Table 1).

8 A day with frost is recorded on each occasion when the daily minimum temperature is equal to or less than 0°C.

9 A heating degree-day (HDD) is an index of the heating requirement to achieve a stipulated comfort value in an indoor environment. For most purposes, a temperature of less than 18°C is considered uncomfortable and supplementary heating is required. On a specific day, the amount by which 18°C exceeds the daily mean temperature defines the number of heating degree-days for that day. Mathematically:

HDD = (18°C - T), for that day,
where T = daily mean temperature in °C
If T is equal to or greater than 18°C, HDD = 0.

Monthly and annual values of HDD are obtained by summing daily values. The normal used for comparison purposes is the adjusted normal published in the Atmospheric Environment Service publication Volume Four of the "Canadian Climate Normals, 1951-1980, Degree Days". The procedure used to adjust the means for stations with five to nineteen years of data is indicated in this volume. An adjustment is required to make the mean comparable to the thirty year normal.

10 In order for plant growth to proceed, air temperature must exceed a critical value appropriate to the plant species in question. For many members of the grass family, including most commercial cereals grown on the prairies, a base temperature of 5.0°C has been established. On a specified day, the difference between the daily mean temperature and the 5.0°C base temperature defines the number of growing degree-days (GDD). Mathematically:

GDD = (T - 5.0°C), for that day,
where T = daily mean temperature in °C
If T is equal to or less than 5.0°C, GDD = 0.

Daily GDD values are summed to provide totals for the appropriate month, growing season or year. The normal value used for comparison is given in Volume Four of the "Canadian Climate Normals, 1951-1980, Degree Days".

11 Total precipitation is the sum of the daily rainfall and daily snowfall amounts recorded. The snowfall component of precipitation is recorded as an equivalent amount of liquid water. For particulars on precipitation measurement procedures and instruments, the reader is referred to the Atmospheric Environment Service publication Manual of Climatological Observations, second edition, January, 1978. The notation T in this column refers to a trace of pre-

cipitation (less than 0.2 mm water equivalent). The normal records used for comparison purposes are those published in Volume Three of the Atmospheric Environment Service publication "Canadian Climate Normals, Precipitation, 1951-1980".

12 Note that prior to 1960, measurement of snowfall was accomplished using snow rulers set vertically in the ground to obtain the thickness of the newly deposited layer. In obtaining precipitation values a standard water equivalent of one inch of snow yielding one-tenth inch of water was assumed. Since these measurements were inaccurate due to snow drifting, compaction and varying water equivalent, the Nipher snow gauge which actually catches snow has been employed at a number of stations (including Saskatoon SRC) in more recent years.

13 A precipitation day is recorded on occasions when the amount of precipitation in a 24-hour period equals or exceeds 0.2 mm water (0.01 inch in English units). If both rain and snow occur on the same day, a snow day, a rain day and a precipitation day are all recorded. If only one form of precipitation occurs on a specified date, a precipitation day, a rain day or a snow day are recorded appropriately. Beginning in 1974, observations at Saskatoon SRC refer to the calendar day. Previous to 1974, the so-called climatological day, beginning at 9 a.m. standard time on the date of reference and ending at 9 a.m. the next morning, was employed in record-keeping. An asterisk (*) appearing in the normal column denotes the occurrence of measurable precipitation on one or more occasions but the 30-year mean when calculated amounts to less than a trace.

14 Evaporation measurements are carried out in the period May 1 to October 31 (weather permitting) only, using the International Hydrological Decade class A pan. The data reported is the sum of the daily net evaporation. Particulars of the measurement procedure are contained in the Atmospheric Environment Service publication "Evaporation", May, 1978. The data base available for comparison is the Saskatoon SRC record for the period 1964 to 1980. The notation M refers to missing data.

15 The mean wind speed value reported is the mean of the hourly wind speeds for the period in question. Average hourly wind speeds are obtained from recording instruments. The anemometer employed is a propeller-type aerofoil at a height of 10 m. Normals used for comparison purposes are those of Saskatoon Airport, from the Atmospheric Environment Service publication "Canadian Normals, Volume 5, Wind 1951-1980".

16 Peak gust refers to the highest instantaneous value recorded by the anemometer system for the period of reference, irrespective of direction and/or duration. Comparison is again with published data for Saskatoon Airport.

17 Total bright sunshine is the sum of the daily bright sunshine values in hours and tenths of hours as recorded by a Campbell-Stokes

sunshine recorder. Atmospheric Environment Service publication, "Bright Sunshine, 1951-1980", Volume 7 supplies information on measurement procedures and normals respectively.

18 Percent possible bright sunshine hours refers to the ratio of measured bright sunshine hours to total possible daylight hours in a given period, expressed as a percentage.

19 Total global solar radiation is the sum of the daily values of short wave solar radiation recorded during the period in question. Measurements are carried out on a horizontal surface at the ground and integrated over the whole celestial dome, summing the diffuse and direct components of the solar beam. The measuring instrument is a temperature-compensated Eppley pyranometer. The standard metric unit of measurement is the megajoule per square metre ($MJ\ m^{-2}$). (To facilitate comparison with past years' data: 1.0 $MJ\ m^{-2}$ = 23.895 langleys). Comparison is provided with a provisional normal based on six years of data (1975-1980). Diffuse solar radiation is also recorded (Table 26). The instrument used is an Eppley pyranometer with a shade ring.

20 The year/day entry appearing in Tables 2 to 13 refers to the year and day on which an extreme event occurred. Reference to the month appears in the table heading. For example, referring to Table 2, the warmest day in January, 1988 was the 15th with a high temperature of 2.0°C, while the warmest January day on record was January 30, 1931 with a high temperature of 10.0°C.

21 Due to missing observations, faulty instrument calibration, lost records, etc., only partial data are available especially during the period 1892 to 1915. The number of years of useful record is therefore cited.

22 Soil temperature, under a short grass surface with normal snow accumulation, is measured according to procedures outlined in the Atmospheric Environment Service publication "Soil Temperature", January 1, 1976. Depths below surface at which soil temperature measurements are made are: 5 cm, 10 cm, 20 cm, 50 cm, 100 cm, 150 cm and 300 cm. Since soil temperature is affected by profile structure and water content, extrapolation of the measured data is difficult.

Table 1. Annual Climatic Summary, Saskatoon SRC, 1988.

	1988[1] Values	1987 Values	Normals[2] (1951-80) and Extremes[3] (1892-1987)
Mean Annual Temperature[4] (°C)	3.9	5.4	1.8
Mean Maximum Temperature[5] (°C)	10.1	11.5	7.5
Mean Minimum Temperature[6] (°C)	-2.3	-0.8	-4.0
Extreme Maximum Temperature[7] (°C)	41.0 (June)	38.0 (June)	40.0 (June, July)
Extreme Minimum Temperature[7] (°C)	-39.5 (Feb.)	-25.0 (Feb., Dec.)	-50.0 (Feb.)
Days with Frost[8]	197	180	199
Heating Degree-Days[9] (18°C base)	5371	4712	6029
Growing Degree-Days[10] (5°C base)	2003	1904	1636
Total Precipitation[11] (mm)	285.7	232.4	370.5
Total Rainfall[11] (mm)	194.8	165.1	243.0
Total Snowfall[12] (cm)	90.9	67.3	118
Greatest 24-hr Precipitation (mm)	25.1 (July)	12.0 (May)	99.4 (June)
Greatest 24-hr Rainfall (mm)	25.1 (July)	12.0 (May)	99.4 (June)
Greatest 24-hr Snowfall (cm)	8.8 (Dec.)	8.4 (Mar.)	36.7 (Oct.)
Precipitation Days[13]	83	99	116.0
Rainfall Days[13]	49	65	59
Snowfall Days[13]	36	39	62
Total Evaporation[14] (mm)	1346.6 (May-Oct.)	1076.4 (May-Oct.)	717.6 (May-Oct.)
Mean Wind Speed[15] (km/hr)	17.2[a]	13.5	17.5[b]
Peak Wind Gust[16] (km/hr)	77 (Sept.)	88 (June-July)	151[b] (Aug.)
Total Bright Sunshine[17] (hr)	2382.2	2020.9	2449.7
Total Global Radiation[19] (MJ m^{-2})	4809.9	3984.8	-
Total Diffuse Radiation[19] (MJ m^{-2})	1502.4	1584.3	-

[a]missing 1 month
[b]information from Saskatoon Airport records

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106°36'W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
JANUARY, 1988

Table 2.

Element	1988 Value	1987 Value	Mean or Extreme Value 1951-1980[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	-17.2	-9.3	-19.1	
Monthly Mean Maximum Temperature[5] (°C)	-11.5	-3.8	-14.2	
Monthly Mean Minimum Temperature[6] (°C)	-22.8	-14.7	-23.9	
Extreme Maximum Temperature[7] (°C)	2.0	5.5	6.1	10.0
Year/Day(s)[20]	1988/15	1987/12	1968/23 and 1973/15	1931/30
Years of Record[21]	1	1	17	90
Extreme Minimum Temperature[7] (°C)	-37.0	-23.5	-43.9	-43.9
Year/Day(s)[20]	1988/5	1987/14 & 15	1966/22 and 1969/29	1893/31
Years of Record[21]	1	1	17	90
Days with Frost[8]	31	31	31	
Heating Degree-Days[9] (18°C base)	1095.5	849.0	1149.0	
Growing Degree-Days[10] (5°C base)	0.0	0.0	0.0	
Total Precipitation[11] (mm)	14.6	11.2	22.6	
Total Rainfall[11] (mm)	0.0	0.2[e]	0.1	
Total Snowfall[12] (cm)	14.6	11.0	21.2	
Greatest 24-hour Precipitation (mm)	4.4	4.4	12.4	30.5
Year/Day(s)[20]	1988/22	1987/17	1969/11	1893/23
Years of Record[21]	1	1	17	90
Greatest 24-hour Rainfall (mm)	0.0	0.2	1.8	2.0
Year/Day(s)[20]	--	1987/13	1976/27	1947/10
Years of Record[21]	1	1	17	90
Greatest 24-hour Snowfall (cm)	4.4	4.4	12.4	30.5
Year/Day(s)[20]	1988/22	1987/17	1969/11	1893/23
Years of Record[21]	1	1	17	90
Precipitation Days[13]	6	6	13	
Rainfall Days[13]	0	1	*	
Snowfall Days[13]	6	6	13	
Total Evaporation[14] (mm)	--	--	May-Sept.	
Mean Wind Speed[15] (km/hr)	12.8[a]	14.1	16.8	
Peak Gust Speed[16] (km/hr)	68.0	72.0	97.0	
Total Bright Sunshine[17] (hr)	107.9	102.2	103.0	
Percent Possible Bright Sunshine[18]	42	40	40	
Total Global Radiation[19] (MJ m^{-2})	129.7	127.6	132.6	
Total Diffuse Radiation[19] (MJ m^{-2})	61.8	60.9	--	
Mean Soil Temperature[22] (°C) (10, 50 cm)	-10.7, -3.5	-5.1, -2.0	-8.7, -3.8	
Mean Soil Temperature[22] (°C) (150, 300 cm)	2.4, 5.2	2.2, 4.8	2.1, 4.5	

SUMMARY:

[e] indicates estimate

[a] 3 days missing data

The monthly mean temperature (-17.2°C) was 1.9°C above the normal. Normal and above normal temperatures were recorded on 19 days while below normal temperatures were recorded on 12 days. Extreme temperatures ranged between 2.0°C (on the 15th) to -37.0°C (on the 5th). Total precipitation (14.6 mm) fell below the 1951-1980 normal by 8.0 mm. Above normal temperatures have resulted in 5% fewer heating degree-days than normal. Total bright sunshine hours (107.9 hours) were slightly above normal (by 4.9 hours). Soil temperatures at the 5-20 cm depths were below normal, while temperatures at the 50-300 cm depths remained above normal. Frost has penetrated the soil to a depth between 100-150 cm.

January, 1988, was a very topsy turvy month. It was cold the beginning of the month, mild the middle of the month and cold again by month's end. January also had below normal precipitation amounts.

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106°36'W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
FEBRUARY 1988

Table 3.

Element	1988 Value	1987 Value	Mean or Extreme Value 1951-1980[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	-12.9	-8.3	-14.5	
Monthly Mean Maximum Temperature[5] (°C)	-7.0	-3.8	-9.3	
Monthly Mean Minimum Temperature[6] (°C)	-18.7	-12.7	-19.7	
Extreme Maximum Temperature[7] (°C)	7.5	4.5	6.1	12.8
Year/Day(s)[20]	1988/26	1987/7	1968/29	1931/19
Years of Record[21]	1	1	17	92
Extreme Minimum Temperature[7] (°C)	-39.5	-25.0	-41.1	-50.0
Year/Day(s)[20]	1988/3&10	1987/26	1972.6	1893/1
Years of Record[21]	1	1	17	92
Days with Frost[8]	29	28	28	
Heating Degree-Days[9] (18°C base)	902.5	736.0	920.4	
Growing Degree-Days[10] (5°C base)	0.0	0.0	0.0	
Total Precipitation[11] (mm)	10.3	16.6	21.9	
Total Rainfall[11] (mm)	0.0	0.0	0.4	
Total Snowfall[12] (cm)	10.3	16.6	18.5	
Greatest 24-hour Precipitation (mm)	4.5	6.2	14.2	20.3
Year/Day(s)[20]	1988/13	1987/14	1979/13	1918/7
Years of Record[21]	1	1	17	91
Greatest 24-hour Rainfall (mm)	0.0	0.0	1.8	8.1
Year/Day(s)[20]	--	--	1968/26	1953/3
Years of Record[21]	1	1	17	92
Greatest 24-hour Snowfall (cm)	4.5	6.2	14.2	20.3
Year/Day(s)[20]	1988/13	1987/14	1979/13	1918/7
Years of Record[21]	1	1	17	91
Precipitation Days[13]	5	8	11	
Rainfall Days[13]	0	0	*	
Snowfall Days[13]	5	8	10	
Total Evaporation[14] (mm)	--	--	--	
Mean Wind Speed[15] (km/hr)	13.7*	12.2	16.4	
Peak Gust Speed[16] (km/hr)	67.0	60.0	85.0	
Total Bright Sunshine[17] (hr)	157.3	117.4	135.1	
Percent Possible Bright Sunshine[18]	57.0	42.8	49.0	
Total Global Radiation[19] (MJ m^{-2})	210.9	199.1	232.9	
Total Diffuse Radiation[19] (MJ m^{-2})	87.0	92.1	--	
Mean Soil Temperature[22] (°C) (10, 50 cm)	-7.9, -3.5	-4.1, -1.5	-7.3, -4.1	
Mean Soil Temperature[22] (°C) (150, 300 cm)	1.0, 3.6	1.3, 3.7	1.0, 3.2	

* 4 days missing data

SUMMARY:

The monthly mean temperature (-12.9°C) was 1.6° above the 1951-80 normal (-14.5°C). Below normal temperatures were recorded on the first 10 days, while above normal mean temperatures were recorded for the remainder of the month. Daily maximum temperature records were equalled and surpassed on the 25th and 26th respectively when temperatures of 7.0°C and 8.0°C were recorded. Extreme temperatures ranged between 7.5°C and -39.5°C. The total precipitation (10.3 mm) recorded was substantially below the normal (21.9 mm). The accumulated winter precipitation (Sept/87-Feb/88) of 63.3 mm falls well below the normal precipitation (136.0 mm) for the same period. The 1987-88 accumulated winter precipitation is less than one half of the normal received. Approximately 16% greater than normal sunshine hours were recorded (157.3 hrs). Soil temperatures with the exception of the 10 cm depth, were normal or above normal.

February was a month of extremes of temperature. It was also characterized by extremely low precipitation amounts.

As is the case in many other areas in agricultural Saskatchewan, the snowcover has been depleted to near zero at the Climate Reference Station.

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106°36'W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
MARCH, 1988

Table 4.

Element	1988 Value	1987 Value	Mean or Extreme Value 1951-1980[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	-3.9	-3.9	-8.5	
Monthly Mean Maximum Temperature[5] (°C)	1.0	0.6	-3.5	
Monthly Mean Minimum Temperature[6] (°C)	-8.3	-8.4	-13.6	
Extreme Maximum Temperature[7] (°C)	10.0	13.0	15.0	22.8
Year/Day(s)[20]	1988/31	1987/6	1973/24	1910/23
Years of Record[21]	1	1	17	92
Extreme Minimum Temperature[7] (°C)	-21.5	-23.5	-38.9	-43.3
Year/Day(s)[20]	1988/13	1987/7	1972/2	1897/14
Years of Record[21]	1	1	17	92
Days with Frost[8]	31	29	31	
Heating Degree-Days[9] (18°C base)	604.5	681.5	826.0	
Growing Degree-Days[10] (5°C base)	0.0	1.5	0.9	
Total Precipitation[11] (mm)	38.0	26.3	22.3	
Total Rainfall[11] (mm)	1.0	0.8	1.1	
Total Snowfall[12] (cm)	37.0	25.5	19.5	
Greatest 24-hour Precipitation (mm)	8.4	8.4	32.0	32.0
Year/Day(s)[20]	1988/26	1987/14	1967/30	1967/30
Years of Record[21]	1	1	17	87
Greatest 24-hour Rainfall (mm)	1.0	0.4	5.6	7.4
Year/Day(s)[20]	1988/26	1987/21, 22	1968/3	1938/28
Years of Record[21]	1	1	17	92
Greatest 24-hour Snowfall (cm)	8.4	8.4	32.0	32.0
Year/Day(s)[20]	1988/26	1987/14	1967/30	1967/30
Years of Record[21]	1	1	17	87
Precipitation Days[13]	10	10	10	
Rainfall Days[13]	1	2	1	
Snowfall Days[13]	10	10	10	
Total Evaporation[14] (mm)	--	--	(May-Sept.)	
Mean Wind Speed[15] (km/hr)	15.2	14.5	17.5	
Peak Gust Speed[16] (km/hr)	72.0	70.0	93.0	
Total Bright Sunshine[17] (hr)	138.4	113.9	190.0	
Percent Possible Bright Sunshine[18]	38	31	52	
Total Global Radiation[19] (MJ m^{-2})	352.1	307.1	422.9	
Total Diffuse Radiation[19] (MJ m^{-2})	163.4	191.5	--	
Mean Soil Temperature[22] (°C) (10, 50 cm)	-1.1, 0.2	-2.0, -0.5	-3.5, -2.1	
Mean Soil Temperature[22] (°C) (150, 300 cm)	1.1, 2.9	1.0, 2.9	0.5, 2.5	

SUMMARY:

The mean temperature (-3.9°C) was 4.6°C above the 1951-1980 normal (-8.5°C). Daily maxima ranged from -10.0°C to 10.0°C while minima ranged from -22.0°C to -1.0°C. Total precipitation (38.0 mm) in March was above normal by 15.7 mm. The January to March total precipitation (62.9 mm) was 3.9 mm below normal for the same period. Twenty-seven percent fewer than normal sunshine hours were recorded (138.4 hours) this month than normal.

March has generally been a warm month with above normal temperatures and precipitation.

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106°36'W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
APRIL, 1988

Table 5.

Element	1988 Value	1987 Value	Mean or Extreme Value 1951-1980[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	5.7	3.5	3.4	
Monthly Mean Maximum Temperature[5] (°C)	13.2	15.8	9.0	
Monthly Mean Minimum Temperature[6] (°C)	-1.8	1.1	-2.3	
Extreme Maximum Temperature[7] (°C)	28.0	27.5	30.6	33.0
Year/Day(s)[20]	1988/29	1987/27	1977/26	1952/28
Years of Record[21]	1	1	17	91
Extreme Minimum Temperature[7] (°C)	-8.0	-7.5	-27.8	-28.3
Year/Day(s)[20]	1988/21 & 22	1987/10	1979/1	1893/1954
Years of Record[21]	1	1	17	91
Days with Frost[8]	22	11	22	
Heating Degree-Days[9] (18°C base)	371.0	280.0	440.0	
Growing Degree-Days[10] (5°C base)	69.0	128.5	47.0	
Total Precipitation[11] (mm)	3.5	13.7	21.4	
Total Rainfall[11] (mm)	0.3	12.1	10.7	
Total Snowfall[12] (cm)	3.2	1.6	10.0	
Greatest 24-hour Precipitation (mm)	3.2	4.5	19.3	30.2
Year/Day(s)[20]	1988/23	1987/18	1968/20	1955/19
Years of Record[21]	1	1	17	91
Greatest 24-hour Rainfall (mm)	0.2	4.5	11.7	26.7
Year/Day(s)[20]	1988/6	1987/18	1964/25	1926/23
Years of Record[21]	1	1	17	91
Greatest 24-hour Snowfall (cm)	3.2	1.6	18.0	20.3
Year/Day(s)[20]	1988/23	1987/9	1968/20	1942/5
Years of Record[21]	1	1	17	91
Precipitation Days[13]	2	6	7	
Rainfall Days[13]	1	6	5	
Snowfall Days[13]	1	1	4	
Total Evaporation[14] (mm)	--	--	(May-Sept.)	
Mean Wind Speed[15] (km/hr)	14.6*	16.0	19.0	
Peak Gust Speed[16] (km/hr)	61	60	108	
Total Bright Sunshine[17] (hr)	257.9**	230.1	232.0	
Percent Possible Bright Sunshine[18]	62	55	56	
Total Global Radiation[19] (MJ m^{-2})	516	428	519	
Total Diffuse Radiation[19] (MJ m^{-2})	161	137	--	
Mean Soil Temperature[22] (°C) (10, 50 cm)	5.2, 4.3	3.8, 5.0	4.0, 2.0	
Mean Soil Temperature[22] (°C) (150, 300 cm)	2.5, 2.8	1.9, 2.6	0.9, 2.1	

* 3 days missing data
** includes automatic data (8th - 30th)

SUMMARY:

April continues this year's trend of above normal mean daily temperatures. The April mean daily temperature (5.7°C) was 2.3°C above the 1951-80 normal. Above normal temperatures were recorded on 20 days, while below normal temperatures were recorded between April 17th to April 26th. Extreme maxima ranged between 3.0°C and 28.0°C, while extreme minima ranged between -8.0°C to 5.5°C. Total precipitation (3.5 mm) recorded fell substantially below the normal (21.4 mm). In addition, the January to April precipitation (66.4 mm) was approximately 25% below the normal. Soil temperatures were above normal at all depths (by 0.7°C to 2.7°C). The mean windspeed (14.6 km/hr) was below normal, and approximately 10% greater than normal sunshine hours were recorded.

April has been a warm and very dry month with above normal temperatures and below normal precipitation. April, 1988 becomes the second driest month during the period since 1941. These conditions did little to alleviate the problem of dry soil moisture conditions in the area.

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106°36'W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
MAY, 1988

Table 6.

Element	1988 Value	1987 Value	Mean or Extreme Value 1951-1980[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	15.5	14.1	11.2	
Monthly Mean Maximum Temperature[5] (°C)	23.5	21.6	18.1	
Monthly Mean Minimum Temperature[6] (°C)	7.5	6.5	4.3	
Extreme Maximum Temperature[7] (°C)	35.0	31.0	34.0	37.2
Year/Day(s)[20]	1988/30	1987/12	1930/21	1936/27
Years of Record[21]	1	1	17	91
Extreme Minimum Temperature[7] (°C)	-1.0	-5.0	-10.0	-12.8
Year/Day(s)[20]	1988/2	1987/21	1967/2	1907/6
Years of Record[21]	1	1	17	91
Days with Frost[8]	1	2	6	
Heating Degree-Days[9] (18°C base)	101.5	119.5	216.0	
Growing Degree-Days[10] (5°C base)	316.5	285.0	199.0	
Total Precipitation[11] (mm)	14.1	33.6	39.6	
Total Rainfall[11] (mm)	14.1	33.6	37.7	
Total Snowfall[12] (cm)	0.0	0.0	1.8	
Greatest 24-hour Precipitation (mm)	5.6	12.0	33.8	51.3
Year/Day(s)[20]	1988/29	1987/28	1975/19	1909/30
Years of Record[21]	1	1	17	91
Greatest 24-hour Rainfall (mm)	5.6	12.0	33.8	51.3
Year/Day(s)[20]	1988/29	1987/28	1975/19	1909/30
Years of Record[21]	1	1	17	91
Greatest 24-hour Snowfall (cm)	0	0	4.3	26.2
Year/Day(s)[20]	--	--	1969/14	1983/10
Years of Record[21]	1	1	17	91
Precipitation Days[13]	6	9	7	
Rainfall Days[13]	6	9	1	
Snowfall Days[13]	0	0	7	
Total Evaporation[14] (mm)	276.0	229.0	208.7	
Mean Wind Speed[15] (km/hr)	14.8*	15.4	19.4	
Peak Gust Speed[16] (km/hr)	63	69	132	
Total Bright Sunshine[17] (hr)	263**	252	292	
Percent Possible Bright Sunshine[18]	54	50	60	
Total Global Radiation[19] (MJ m^{-2})	603	584	659	
Total Diffuse Radiation[19] (MJ m^{-2})	228	210	--	
Mean Soil Temperature[22] (°C) (10, 50 cm)	14.5, 11.2	13.2, 10.3	12.3, 8.8	
Mean Soil Temperature[22] (°C) (150, 300 cm)	5.6, 3.9	5.6, 3.8	4.1, 2.9	

*6 days missing data

**includes automated data May 1-25

SUMMARY:

Extremely high temperatures throughout the month resulted in the highest monthly mean temperature (15.5°C) during the 91 year record. Above normal temperatures were recorded for the entire month with the exception of May 9th. The record daily maximum temperature was equalled on May 29th with a temperature of 34.0°C. Below normal precipitation continues to be the main story. Once again this year, less than 40% of the normal precipitation was recorded at the climate reference station. Although 14.1 mm of rain was recorded, more rain is needed to alleviate the soil moisture deficiency in the area. Despite below normal mean windspeeds (14.1 km/hr) this month, a combination of hot, dry weather has resulted in several days with blowing dust. Net evaporation (276 mm) was substantially above the normal (208 mm). Soil temperatures at all depths continue to be above normal.

With the exception of below normal precipitation, the weather turned out to be near perfect. Above normal temperatures have made this a very warm month.

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106°36'W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
JUNE, 1988

Table 7.

Element	1988 Value	1987 Value	Mean or Extreme Value 1951-1980[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	21.3	18.9	15.6	
Monthly Mean Maximum Temperature[5] (°C)	28.8	26.0	22.1	
Monthly Mean Minimum Temperature[6] (°C)	13.8	11.7	9.1	
Extreme Maximum Temperature[7] (°C)	41.0	38.0	35.6	41.0
Year/Day(s)[20]	1988/5th	1987/15	1976/4	1988/5th
Years of Record[21]	1	1	17	92
Extreme Minimum Temperature[7] (°C)	4.0	5.5	-3.3	-3.9
Year/Day(s)[20]	1988/15	1987/4	1967/6	1903/9 & 1917/2
Years of Record[21]	1	1	17	92
Days with Frost[8]	0	0	0	
Heating Degree-Days[9] (18°C base)	15.0	25.5	89.0	
Growing Degree-Days[10] (5°C base)	495.0	419.5	319.0	
Total Precipitation[11] (mm)	23.7	22.0	59.9	
Total Rainfall[11] (mm)	23.7	22.0	59.0	
Total Snowfall[12] (cm)	0	0	0	
Greatest 24-hour Precipitation (mm)	11.0	8.0	45.0	99.4
Year/Day(s)[20]	1988/29	1987/20	1970/10	1983/24
Years of Record[21]	1	1	17	92
Greatest 24-hour Rainfall (mm)	11.0	8.0	45.0	99.4
Year/Day(s)[20]	1988/29	1987/20	1970/10	1983/24
Years of Record[21]	1	1	17	92
Greatest 24-hour Snowfall (cm)	-	-	0	1.8
Year/Day(s)[20]	-	-	-	1938/29
Years of Record[21]	-	-	17	92
Precipitation Days[13]	10	11	11	
Rainfall Days[13]	10	11	11	
Snowfall Days[13]	0	0	0	
Total Evaporation[14] (mm)	352.1	265.5	218.3	
Mean Wind Speed[15] (km/hr)	16.5*	16.0	18.2	
Peak Gust Speed[16] (km/hr)	68	88	101	
Total Bright Sunshine[17] (hr)	323.1	255.5	294.0	
Percent Possible Bright Sunshine[18]	65	51	59	
Total Global Radiation[19] (MJ m^{-2})	685	614	683	
Total Diffuse Radiation[19] (MJ m^{-2})	167	227	-	
Mean Soil Temperature[22] (°C) (10, 50 cm)	21.0, 17.2	18.6, 14.7	17.5, 14.0	
Mean Soil Temperature[22] (°C) (150, 300 cm)	9.5, 6.0	8.8, 5.7	8.3, 5.2	

* 6 days missing data

SUMMARY:

The mean temperature of 21.3°C recorded at the Climate Reference Station makes June/88 the warmest on record during the 92 - year period. In addition, daily maximum temperature records were surpassed on six days. The previous extreme maximum temperature record (40°C, 1919 & 1941) was also broken when a temperature of 41.0°C was recorded on the 5th. With the exception of the 13 - 15th, above normal temperatures have been prevalent through the month producing the longest warm spell (May 16 - June 12th, 28 days) to date. Only 40% of the normal precipitation was recorded (23.7 mm). This is the ninth driest June during the entire period of record. Excluding March's above normal precipitation, all other months to date have experienced below normal precipitation. As of the end of June, only 55% of the normal total precipitation has been recorded. Fifty-five percent greater than normal growing degree days should have been beneficial to crops, however the intense heat and dry conditions have hampered this effect. Bright sunshine hours, soil temperatures and global radiation values were all above normal.

While temperature records were broken and precipitation was lacking, June was an extremely hot and dry month. The extreme heat and mistimed precipitation events have resulted such effects as damage to local area crops, and water supply problems.

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106°36'W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
JULY, 1988

Table 8.

Element	1988 Value	1987 Value	Mean or Extreme Value 1951-1980[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	19.2	18.3	18.4	
Monthly Mean Maximum Temperature[5] (°C)	26.6	24.7	25.2	
Monthly Mean Minimum Temperature[6] (°C)	11.7	11.9	11.6	
Extreme Maximum Temperature[7] (°C)	37.0	33.5	36.7	40.0
Year/Day(s)[20]	1988/22nd	1987/27	1964/12	1919/17;1941/19
Years of Record[21]	1	1	17	92
Extreme Minimum Temperature[7] (°C)	16.0	5.0	1.7	-0.6
Year/Day(s)[20]	1988/9th	1987/11	1967/2	1918/25
Years of Record[21]	1	1	17	92
Days with Frost[8]	0	0	0	
Heating Degree-Days[9] (18°C base)	16.5	40.0	32.8	
Growing Degree-Days[10] (5°C base)	451.5	416.5	416.3	
Total Precipitation[11] (mm)	47	26.3	56.2	
Total Rainfall[11] (mm)	47	26.3	56.2	
Total Snowfall[12] (cm)	0.0	0.0	0.0	
Greatest 24-hour Precipitation (mm)	25.1	7.4	45.5	79.2
Year/Day(s)[20]	1988/6th	1987/18	1968/29	1946/3
Years of Record[21]	1	1	17	92
Greatest 24-hour Rainfall (mm)	25.1	7.4	45.5	79.2
Year/Day(s)[20]	1988/6th	1987/88	1968/29	1946/3
Years of Record[21]	1	1	17	92
Greatest 24-hour Snowfall (cm)	0.0	0.0	0.0	0.0
Year/Day(s)[20]	--	--	--	--
Years of Record[21]	1	1	17	--
Precipitation Days[13]	7	13	11	
Rainfall Days[13]	7	13	11	
Snowfall Days[13]	0	0	0	
Total Evaporation[14] (mm)	290.7	210.8	230.1	
Mean Wind Speed[15] (km/hr)	14.8	11.7	16.7	
Peak Gust Speed[16] (km/hr)	M	88	105	
Total Bright Sunshine[17] (hr)	336.5	217.1	341.0	
Percent Possible Bright Sunshine[18]	67.1	43	68	
Total Global Radiation[19] (MJ m^{-2})	661.1	426*	737	
Total Diffuse Radiation[19] (MJ m^{-2})	195.1	162*	--	
Mean Soil Temperature[22] (°C) (10, 50 cm)	18.2, 17.9	19.2,16.2	19.7, 16.9	
Mean Soil Temperature[22] (°C) (150, 300 cm)	11.5, 8.6	10.8, 7.6	11.4, 7.6	

* 5 days missing data due to equipment repair
2 days missing data due to power outage
M data missing

SUMMARY:

July continues this years trend of higher than normal monthly temperatures. The mean temperature was almost 1°C above normal. Above normal temperatures were recorded for a total of 16 days. Maximum daily temperatures ranged from a high of 37°C on the 22nd to a low of 16°C on the 9th. This maximum of 37°C exceeded the July extreme of 36.7°C of the 1951-80 standard period. Precipitation was 83.6% of normal at 47.0 mm. The January to July total precipitation of 151.2 was 92.5 mm below normal for the same time period. While the total number of growing degree-days (451.5) was above normal the total number of heating degree-days was below normal (16.5). Mean soil temperatures at 5 cm and 10 cm were below normal by 1.0°C and 1.5°C. Mean soil temperatures at the 20 to 300 cm levels were above normal. July was another warm and dry month with many above normal daily temperatures.

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106°36'W 497 m MSL
MONTHLY WEATHER SUMMARY FOR

Table 9.

AUGUST, 1988

Element	1988 Value	1987 Value	Mean or Extreme Value 1951-1980[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	16.8	14.8	17.2	
Monthly Mean Maximum Temperature[5] (°C)	22.4	21.2	24.2	
Monthly Mean Minimum Temperature[6] (°C)	11.1	8.3	10.2	
Extreme Maximum Temperature[7] (°C)	31.0	29.5	36.7	37.8
Year/Day(s)[20]	1988/13th	1987/7th & 23th	1970/7	1893/6, 1949/6
Years of Record[21]	1	1	17	91
Extreme Minimum Temperature[7] (°C)	3.0	3.0	-2.3	-2.8
Year/Day(s)[20]	1983/28th	1987/22nd & 30th	1976/28	1976/28
Years of Record[21]	1	1	17	91
Days with Frost[8]	0	0	0	
Heating Degree-Days[9] (18°C base)	49.5	105.5	60.1	
Growing Degree-Days[10] (5°C base)	371.5	305.5	378.7	
Total Precipitation[11] (mm)	78.2	44.3	35.1	
Total Rainfall[11] (mm)	78.2	44.3	35.1	
Total Snowfall[12] (cm)	0.0	0.0	0.0	
Greatest 24-hour Precipitation (mm)	20.4	11.6	24.6	73.7
Year/Day(s)[20]	1988/1st	1987/14	1960/18	1945/3
Years of Record[21]	1	1	17	91
Greatest 24-hour Rainfall (mm)	20.4	11.6	24.6	73.7
Year/Day(s)[20]	1988/1st	1987/14	1960/18	1945/3
Years of Record[21]	1	1	17	91
Greatest 24-hour Snowfall (cm)	0.0	0.0	0.0	0.0
Year/Day(s)[20]	-	-	-	-
Years of Record[21]	1	1	17	
Precipitation Days[13]	11	11	10	
Rainfall Days[13]	11	11	10	
Snowfall Days[13]	0	0	0	
Total Evaporation[14] (mm)	195.4	157.2	201.4	
Mean Wind Speed[15] (km/hr)	M	10.6	16.5	
Peak Gust Speed[16] (km/hr)	72	58	151	
Total Bright Sunshine[17] (hr)	238.1	200.8	293.0	
Percent Possible Bright Sunshine[18]	53	44	65	
Total Global Radiation[19] (MJ m^{-2})	516.2	481.7	605.0	
Total Diffuse Radiation[19] (MJ m^{-2})	143.9	191.2	--	
Mean Soil Temperature[22] (°C) (10, 50 cm)	17.7, 16.6	16.2, 15.8	18.4, 16.7	
Mean Soil Temperature[22] (°C) (150, 300 cm)	12.1, 11.9	11.8, 9.0	12.6, 9.3	

SUMMARY

August's mean temperature (16.8°C) was only 0.4° below normal. The mean daily temperature was below the 17.2°C normal for 16 out of the 31 days. The extreme temperatures ranged from a low of 3°C (August 28th) to a high of 31.0 (August 13th). The precipitation for the month of August was close to 45% above normal, but it came too late in the season to be of much benefit to the agricultural sector. Growing degree-days (371.5) were near normal, while heating degree-days were 10.6 less than normal. The total evaporation of 195.mm was near the normal of 201.4 mm, while total bright sunshine was 55 hours less than normal. Soil temperatures were similar to previous years.

August provided a strong contrast to the rest of the summer with several cool rainy days.

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106°36'W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
SEPTEMBER, 1988

Table 10.

Element	1988 Value	1987 Value	Mean or Extreme Value 1951-1980[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	11.8	14.4	11.5	
Monthly Mean Maximum Temperature[5] (°C)	18.5	22.2	17.8	
Monthly Mean Minimum Temperature[6] (°C)	5.1	6.5	5.1	
Extreme Maximum Temperature[7] (°C)	35.0	35.0	35.6	35.6
Year/Day(s)[20]	1988/6	1987/2	1978/4	1978/4
Years of Record[21]	1	1	16	89
Extreme Minimum Temperature[7] (°C)	-2.5	0.5	-7.8	-11.1
Year/Day(s)[20]	1988/25	1987/18	1978/30	1908/28
Years of Record[21]	1	1	16	89
Days with Frost[8]	4	0	4	
Heating Degree-Days[9] (18°C base)	192.5	121.0	201.3	
Growing Degree-Days[10] (5°C base)	209.0	284.5	200.8	
Total Precipitation[11] (mm)	22.3	14.5	32.2	
Total Rainfall[11] (mm)	22.3	14.5	30.8	
Total Snowfall[12] (cm)	0.0	0.0	1.3	
Greatest 24-hour Precipitation (mm)	12.0	7.0	29.6	44.2
Year/Day(s)[20]	1988/25	1987/3	1980/3	1931/12
Years of Record[21]	1	1	16	89
Greatest 24-hour Rainfall (mm)	12.0	7.0	29.6	44.2
Year/Day(s)[20]	1988/25	1987/3	1980/3	1931/12
Years of Record[21]	1	1	16	89
Greatest 24-hour Snowfall (cm)	0.0	0.0	5.6	17.6
Year/Day(s)[20]	--	--	1973/14	1982/28
Years of Record[21]	1	1	16	89
Precipitation Days[13]	8	5	9	
Rainfall Days[13]	8	5	9	
Snowfall Days[13]	0	0	1	
Total Evaporation[14] (mm)	154.1	156.2	124.1	
Mean Wind Speed[15] (km/hr)	15.2	11.8	18.1	
Peak Gust Speed[16] (km/hr)	77.0	63.0	148.0	
Total Bright Sunshine[17] (hr)	186.7	197.4	191.0	
Percent Possible Bright Sunshine[18]	49	52	50	
Total Global Radiation[19] (MJ m^{-2})	427.6*	386.7	409.3	
Total Diffuse Radiation[19] (MJ m^{-2})	111.1*	114.8	--	
Mean Soil Temperature[22] (°C) (10, 50 cm)	11.4, 13.7	13.7, 14.1	12.3, 13.2	
Mean Soil Temperature[22] (°C) (150, 300 cm)	11.6, 11.1	11.4, 9.5	12.1, 10.1	

*Total diffuse radiation and total global radiation are low due to incomplete data.

SUMMARY:

The September mean temperature (11.8°C) was only slightly above the 11.5°C normal. The above normal temperatures occurred in the first half of the month as illustrated by the extreme maximum of 35.0°C occurring on September 6, 1988. The first day of frost occurred on September 19, 1988 with a temperature of -1.0°C while the extreme minimum of -2.5°C was recorded six days later. The month had 69.2% of normal precipitation (32.2 mm), all of which fell as rainfall (22.3 mm). The January to September total precipitation of 251.7 mm is at about 86% of the normal precipitation value. The amount of bright sunshine (186.7 hours)was only 4.3 hours less than the mean value (191.0 hours). The soil temperatures at all levels were within 1.0°C of the normal amount.

September has been a typical fall month with near normal temperatures and below normal precipitation.

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106°36'W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
OCTOBER, 1988

Table 11.

Element	1988 Value	1987 Value	Mean or Extreme Value 1951-1980[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	5.4	5.0	5.2	
Monthly Mean Maximum Temperature[5] (°C)	12.4	11.5	11.1	
Monthly Mean Minimum Temperature[6] (°C)	-1.7	-1.6	-0.8	
Extreme Maximum Temperature[7] (°C)	25	26.0	28.3	32.2
Year/Day(s)[20]	1988/8	1987/3	1964/13	1943/5
Years of Record[21]	1	1	17	89
Extreme Minimum Temperature[7] (°C)	-14.5	-6.5	-18.3	-25.6
Year/Day(s)[20]	1988/29	1987/24	1972/18	1919/26
Years of Record[21]	1	1	17	89
Days with Frost[8]	20	23	18	
Heating Degree-Days[9] (18°C base)	391.5	402.5	398.0	
Growing Degree-Days[10] (5°C base)	88.0	58	71.1	
Total Precipitation[11] (mm)	7.9	11.3	17.5	
Total Rainfall[11] (mm)	7.4	8.2	7.7	
Total Snowfall[12] (cm)	0.5	3.1	10.3	
Greatest 24-hour Precipitation (mm)	4.2	6.0	25.4	36.7
Year/Day(s)[20]	1988/16	1987/3	1969/2	1984/16
Years of Record[21]	1	1	17	89
Greatest 24-hour Rainfall (mm)	4.2	6.0	23.1	34.0
Year/Day(s)[20]	1988/16	1987/3	1969/2	1914/5
Years of Record[21]	1	1	17	89
Greatest 24-hour Snowfall (cm)	0.5	2.1	22.9	36.7
Year/Day(s)[20]	1988/26	1987/18	1969/3	1984/16
Years of Record[21]	1	1	17	89
Precipitation Days[13]	5	6	5	
Rainfall Days[13]	4	3	3	
Snowfall Days[13]	2	3	3	
Total Evaporation[14] (mm)	78.3c	57.8a	--	
Mean Wind Speed[15] (km/hr)	25.1d	15.1b	18.0	
Peak Gust Speed[16] (km/hr)	60	67	138	
Total Bright Sunshine[17] (hr)	208.1	135.1	175.0	
Percent Possible Bright Sunshine[18]	63	41	53	
Total Global Radiation[19] (MJ m^{-2})	353.9	232.7	255.6	
Total Diffuse Radiation[19] (MJ m^{-2})	74.8	98.3	--	
Mean Soil Temperature[22] (°C) (10, 50 cm)	4.7,8.9	5.9,9.1	5.4,8.0	
Mean Soil Temperature[22] (°C) (150, 300 cm)	10.0,11.1	10.0,9.4	9.8,9.5	

a. Evaporation program was discontinued after October 17, 1987 and October 27, 1986
b. 26 days in 1987.
c. Evaporation program discontinued October 24, 1988
d. Calculated with 23 days of data

SUMMARY:

October saw a higher than normal mean monthly temperature of 5.4° with the extreme maximum (25°C) occurring at the start of the month. The extreme minimum temperature of -14.5°C did not occur until the 29th of the month. Frost has been recorded since the 21st, with a total of 20 days with below 0.0°C temperatures. Precipitation for October was only 45% of normal, most of which fell as rainfall (7.4 mm). October saw 33.1 more hours of sunshine than the normal (175.0). The total global radiation of 353.9 MJM^{-2} was over one hundred more than normal. The total diffuse radiation was more than 20 MJM^{-2} less than the value for October 1987. Soil Temperatures at the 10 and 50 cm depth tended to be cooler than the 1987 values while the 1988 150 and 300 cm depths were the same and 1.7°C warmer.

October has been an extremely sunny month with very little precipitation. This month has been an example of why October was traditionally thought of as the harvest month.

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106°36'W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
NOVEMBER, 1988

Table 12.

Element	1988 Value	1987 Value	Mean or Extreme Value 1951-1980[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	-3.9	-0.3	-5.5	
Monthly Mean Maximum Temperature[5] (°C)	-0.1	5.3	-1.0	
Monthly Mean Minimum Temperature[6] (°C)	-7.6	-5.8	-10.0	
Extreme Maximum Temperature[7] (°C)	12.0	14.0	19.4	21.7
Year/Day(s)[20]	1988/5	1987/10	1975/4	1903/3
Years of Record[21]	1	1	18	90
Extreme Minimum Temperature[7] (°C)	-19.5	-14.0	-32.8	-39.4
Year/Day(s)[20]	1988/17 & 27	1987/17 & 19	1970/27	1893/30
Years of Record[21]	1	1	18	90
Days with Frost[8]	28	26	29	
Heating Degree-Days[9] (18°C base)	656.5	554.0	704.4	
Growing Degree-Days[10] (5°C base)	2.5	5.0	2.6	
Total Precipitation[11] (mm)	7.9	1.6	16.0	
Total Rainfall[11] (mm)	0.8	1.4	2.5	
Total Snowfall[12] (cm)	7.1	0.2	12.3	
Greatest 24-hour Precipitation (mm)	3.6	0.8	19.3	27.9
Year/Day(s)[20]	1988/12	1987/21	1978/4	1938/1
Years of Record[21]	1	1	18	90
Greatest 24-hour Rainfall (mm)	0.8	0.8	14.5	14.5
Year/Day(s)[20]	1988/6	1987/21	1978/4	1978/4
Years of Record[21]	1	1	18	90
Greatest 24-hour Snowfall (cm)	3.6	0.2	13.2	27.9
Year/Day(s)[20]	1988/12	1987/23	1966/16	1938/1
Years of Record[21]	1	1	18	90
Precipitation Days[13]	7	3	9	
Rainfall Days[13]	1	3	1	
Snowfall Days[13]	6	1	8	
Total Evaporation[14] (mm)	--	--	--	
Mean Wind Speed[15] (km/hr)	23.8[c]	11.0[a]	16.9	
Peak Gust Speed[16] (km/hr)	75.0	66.0	100.0	
Total Bright Sunshine[17] (hr)	83.8	110.5[b]	109.0	
Percent Possible Bright Sunshine[18]	32	42	41	
Total Global Radiation[19] (MJ m^{-2})	190.6	118.4	129.3	
Total Diffuse Radiation[19] (MJ m^{-2})	59.7	56.5	--	
Mean Soil Temperature[22] (°C) (10, 50 cm)	-1.2, 3.8	-0.6, 4.5	-1.7, 2.5	
Mean Soil Temperature[22] (°C) (150, 300 cm)	7.4, 8.3	7.4, 8.3	6.9, 8.1	

[a] 3 days of missing data

[b] includes 2 days of automatic data

[c] 3 days of missing data

SUMMARY:

November's mean temperature of -3.9°C was 1.6°C above normal. The mean maximum and mean minimum temperatures were also above normal by 0.9°C and 2.4°C. The month of November received only half of the normal precipitation. A minimal snow cover was formed this month but it soon disappeared during a period of warm windy days. The mean wind speed was well above normal at 23.8 km/hr. The peak wind speed of 75 km/hr occurred on November 6. The amount of bright sunshine was well below normal at only 32% of the total possible amount. The mean soil temperatures were above normal (by 0.2°C to 1.3°C) at all levels.

November was a warm, windy and dry month.

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106°36'W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
DECEMBER, 1988

Table 13.

Element	1988 Value	1987 Value	Mean or Extreme Value 1951-1980[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	-11.0	-7.7	-13.9	
Monthly Mean Maximum Temperature[5] (°C)	-6.2	-2.9	-9.3	
Monthly Mean Minimum Temperature[6] (°C)	-15.7	-12.4	-18.5	
Extreme Maximum Temperature[7] (°C)	7.0	9.5	8.0	13.3
Year/Day(s)[20]	1988/2	1987/7	1980/27	1939/5
Years of Record[21]	1	1	18	90
Extreme Minimum Temperature[7] (°C)	-34.5	-25.0	-42.2	-43.9
Year/Day(s)[20]	1988/25 & 28	1987/30 & 31	1973/31	1892/22
Years of Record[21]	1	1	18	90
Days with Frost[8]	31	30	31	
Heating Degree-Days[9] (18°C base)	894.0	797.0	992.0	
Growing Degree-Days[10] (5°C base)	0.0	0.0	0.0	
Total Precipitation[11] (mm)	18.2	11.0	25.9	
Total Rainfall[11] (mm)	0.0	1.7	0.8	
Total Snowfall[12] (cm)	18.2	9.3	23.1	
Greatest 24-hour Precipitation (mm)	8.8	3.4	14.5	20.6
Year/Day(s)[20]	1988/22	1987/16	1973/23	1936/24
Years of Record[21]	1	1	18	89
Greatest 24-hour Rainfall (mm)	0.0	1.6	4.3	4.8
Year/Day(s)[20]	--	1987/9	1979/6	1956/26
Years of Record[21]	--	1	18	90
Greatest 24-hour Snowfall (cm)	8.8	3.4	14.5	20.6
Year/Day(s)[20]	1988/22	1987/16	1973/23	1936/24
Years of Record[21]	1	1	18	89
Precipitation Days[13]	6	11	13	
Rainfall Days[13]	0	1	1	
Snowfall Days[13]	6	10	12	
Total Evaporation[14] (mm)	--	--	--	
Mean Wind Speed[15] (km/hr)	22.8[a]	13.6[c]	16.8	
Peak Gust Speed[16] (km/hr)	71	54	97	
Total Bright Sunshine[17] (hr)	81.4	88.9	86.0	
Percent Possible Bright Sunshine[18]	34	37	36	
Total Global Radiation[19] (MJ m^{-2})	163.8[b]	79.5[d]	96.0	
Total Diffuse Radiation[19] (MJ m^{-2})	49.6[b]	43.0[d]	--	
Mean Soil Temperature[22] (°C) (10, 50 cm)	-6.3, -0.7	-3.9, 1.1	-6.6, -1.8	
Mean Soil Temperature[22] (°C) (150, 300 cm)	4.5, 6.7	5.0, 7.6	3.9, 6.2	

[a] 7 days missing data [b] 1 day missing data [c] 4 days missing data [d] 2 days missing data

SUMMARY:

December has continued the trend that has predominated the previous months of 1988 by being warmer (by 2.9°C) and drier (by 7.6 mm) than normal. The first half of December was much warmer and drier than the second half; from the 1st to the 20th only 1 cm of snowfall was recorded with the rest falling in the remainder of the month. The mean wind speed was higher than normal. The higher than normal speeds were recorded in the beginning of the month when it was fairly warm. The total bright sunshine was just a little less than normal, though the global radiation was much higher. The total diffuse radiation was about the same as last years when the missing data is taken into consideration. The mean soil temperatures were very close to normal, but the 10 and 50 cm depths were cooler than last year's values. This may be due to the cooler air temperatures recorded this year.

December in Saskatoon lived up to its tradition of having a white Christmas. It snowed 8.8 cm two days before Santa was due!

Table 14. Soil Temperature and Snow Cover at Saskatoon SRC, January, 1988.*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	-10.6	11.0	31	1	2
10	-10.4	9.5	31	5	3.5
20	-8.0	8.5	31	10	2.5
50	-3.5	5.0	31	15	3
100	0.2	2.5	16	20	4
150	2.4	2.5	0	25	7
300	5.2	2.0	0	31	8

*at 0900 h

Table 15. Soil Temperature and Snow Cover at Saskatoon SRC, February, 1988.*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	-7.7	10.5	29	1	8
10	-7.6	11.0	29	5	8
20	-6.0	8.5	29	10	9
50	-3.5	4.5	29	15	11
100	-0.8	0.5	29	20	10
150	1.0	1.0	0	25	2
300	3.6	1.0	0	29	0

*at 0900 h

Table 16. Soil Temperature and Snow Cover at Saskatoon SRC, March, 1988.*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	-1.1	4.0	18	1	0
10	-0.9	4.5	15	5	0
20	0.2	2.5	11	10	6
50	0.2	2.0	7	15	18
100	0.0	1.0	7	20	10
150	1.1	0.5	0	25	3
300	2.9	0.5	0	31	3

*at 0900 h

Table 17. Soil Temperature and Snow Cover at Saskatoon SRC, April, 1988.*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	3.5	9.5	0	1	0
10	3.9	9.0	0	5	0
20	5.5	9.5	0	10	0
50	4.3	6.5	0	15	0
100	2.6	3.0	0	20	0
150	2.5	2.0	0	25	0
300	2.8	0.5	0	30	0

*at 0900 h

Table 18. Soil Temperature and Snow Cover at Saskatoon SRC, May, 1988.*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	12.8	9.5	0	1	0
10	12.9	10.0	0	5	0
20	14.3	9.5	0	10	0
50	11.2	7.0	0	15	0
100	7.1	5.5	0	20	0
150	5.6	4.0	0	25	0
300	3.9	2.0	0	31	0

*at 0900 h

Table 19. Soil Temperature and Snow Cover at Saskatoon SRC, June, 1988.*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	19.6	8.0	0	1	0
10	19.8	7.5	0	5	0
20	21.4	6.5	0	10	0
50	17.2	4.0	0	15	0
100	11.8	3.5	0	20	0
150	9.5	3.5	0	25	0
300	6.0	2.0	0	30	0

*at 0900 h

Table 20. Soil Temperature and Snow Cover at Saskatoon SRC, July, 1988.*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	18.6	9.5	0	1	0
10	18.2	8.5	0	5	0
20	20.8	8.5	0	10	0
50	17.9	3.5	0	15	0
100	13.4	1.5	0	20	0
150	11.5	1.5	0	25	0
300	8.6	5.5	0	31	0

*at 0900 h

Table 21. Soil Temperature and Snow Cover at Saskatoon SRC, August, 1988.*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	15.8	9.0	0	1	0
10	16.2	8.5	0	5	0
20	18.1	8.0	0	10	0
50	16.6	5.0	0	15	0
100	13.6	2.5	0	20	0
150	12.1	1.0	0	25	0
300	11.9	5.5	0	31	0

*at 0900 h

Table 22. Soil Temperature and Snow Cover at Saskatoon SRC, September, 1988.*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	10.9	13.5	0	1	0
10	11.4	12.5	0	5	0
20	13.5	11.0	0	10	0
50	13.7	6.0	0	15	0
100	12.1	3.5	0	20	0
150	11.6	1.5	0	25	0
300	11.1	5.5	0	30	0

*at 0900 h

Table 23. Soil Temperature and Snow Cover at Saskatoon SRC, October, 1988.*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	4.3	12.0	4	1	0
10	4.7	11.0	3	5	0
20	7.3	10.0	0	10	0
50	8.9	6.0	0	15	0
100	9.4	3.0	0	20	0
150	10.0	2.0	0	25	0
300	11.1	5.5	0	31	0

*at 0900 h

Table 24. Soil Temperature and Snow Cover at Saskatoon SRC, November, 1988.*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	-1.5	13.5	20	1	0
10	-1.2	12.5	18	5	0
20	0.9	9.5	5	10	0
50	3.8	5.5	0	15	6
100	5.9	3.5	0	20	6
150	7.4	2.5	0	25	0
300	8.3	1.5	0	30	0

*at 0900 h

Table 25. Soil Temperature and Snow Cover at Saskatoon SRC, December, 1988.*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	-6.7	8.0	31	1	0
10	-6.3	8.0	31	5	0
20	-4.2	6.0	31	10	0
50	-0.7	3.0	22	15	0
100	2.5	3.0	0	20	0
150	4.5	3.0	0	25	10
300	6.7	1.5	0	31	8

*at 0900 h

Table 26. Diffuse Solar Radiation (MJ m^{-2}) at Saskatoon SRC, 1988.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.9	2.6	4.6	4.5	9.5	4.2	5.7	2.0	2.9	1.8	3.0	2.0
2	1.7	2.6	2.3	6.2	10.9*	3.2	6.8	3.8	2.0	2.0	1.5	1.1
3	1.5	2.7	2.1	7.0	5.7	5.0	5.3	6.1	2.1	2.2	2.9	2.1
4	1.3	2.0	4.0	6.4	7.7	4.6	10.5*	4.4	2.3	1.7	1.6	1.6
5	1.3	2.3	2.7	4.1	9.0	3.6	9.8	2.9	2.7	2.7	1.4	0.9
6	1.4	3.5	4.4	3.1	8.5	4.0	5.1	7.3	6.2	1.4	2.1	0.8
7	1.1	2.9	5.9	5.4	8.8	6.2	9.0	7.5	5.0	1.4	2.1	1.7
8	1.8	3.1	3.7	7.4	8.4	9.7	5.1	2.2	4.1	2.6	1.8	M
9	1.5	3.7	4.0	4.9	M	2.5	9.6	9.9	2.9	2.1	2.5	1.4
10	2.2	2.3	6.5	3.2	7.9	5.4	8.9	3.6	3.9	1.9	1.1	1.7
11	1.6	2.3	8.0	3.4	7.8	4.5	3.7	5.1	6.2	2.0	2.2	1.3
12	1.8	3.7	3.0	2.6	4.3	5.3	7.4	3.8	2.2	1.8	2.2	0.9
13	2.2	2.9	3.1	2.9	5.4	10.6*	6.6	7.0	1.9	2.1	3.7	1.9
14	1.6	4.6	3.6	2.9	3.8	8.9	6.0	7.8	2.8	3.1	1.5	2.0
15	2.4	4.5	9.2	4.5	6.5	2.8	3.7	3.8	3.3	1.8	2.1	1.6
16	1.1	3.3	6.5	7.4	5.6	4.5	3.5	1.9	5.7	3.9	1.9	1.4
17	1.7	2.7	2.8	3.3	8.5	10.6*	7.8	7.8	3.5	5.9	2.1	1.2
18	1.4	4.2	6.3	2.8	9.4	6.4	7.9	5.2	6.5	1.6	2.7	1.0
19	1.8	5.0	8.7	10.2*	6.7	2.8	4.8	5.8	4.7	3.2	2.2	1.4
20	1.5	5.1	8.0	4.5	5.5	7.0	3.6	4.0	6.6	2.4	2.0	1.5

Note: M means missing values
* means these values are questionably high (shade ring problem)

Table 26. (Continued)

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
21	2.3	2.3	5.5	3.4	3.4	6.1	3.7	6.3	2.5	3.4	1.8	2.6
22	1.5	2.2	5.0	7.0	4.6	7.5	5.9	2.3	4.8	2.3	2.1	1.5
23	2.3	M	7.7	5.4	7.2	6.0	2.6	2.7	5.6	2.7	1.5	1.8
24	1.3	3.3	3.5	8.5	9.1	9.5	8.4	3.5	5.8	2.8	2.3	1.7
25	3.1	2.1	3.5	8.4	4.3	4.4	8.4	2.2	2.8	1.7	1.3	2.2
26	2.9	4.6	4.7	5.4	6.6	8.6	4.3	6.5	M	2.2	2.0	2.0
27	3.6	M	6.2	6.1	9.8	5.3	6.8	4.0	M	2.9	1.3	2.6
28	3.4	1.7	11.2*	3.5	7.4	6.6	9.2	2.1	4.6	1.8	1.6	2.0
29	2.8	4.8	5.8	8.7	19.1*	6.4	4.2	2.6	4.7	2.5	1.2	2.6
30	3.2		3.6	8.0	4.7	9.6	5.1	4.7	2.8	3.4	2.0	2.0
31	2.6		7.2		11.5*		5.7	5.1		1.5		2.6
Total Diffuse	61.8	87.0	163.4	161.1	227.6	167.8	195.1	143.9	111.1	74.8	59.7	49.6
Total Global	129.7	210.9	352.1	516.0	603.0	685.0	661.1	516.2	427.6	353.9	190.6	163.8

Note: M means missing values.
* means these values are questionably high (shade ring problem)

Table 27. Some Significant Climatic Events, 1988.

FROST FREE SEASON

	Last Spring Frost	First Fall Frost	Length of Season
1988	May 2	September 19	139
1987	May 21	October 6	137
1951-80 Normal	May 23	September 9	108

SNOW SEASON

Greatest Depth of Snow on Ground (cm)

	Jan.	Feb.	Mar.	Apr.	Oct.	Nov.	Dec.
1988	10	12	19	0	0	6	10
1987	8	13	10	0	0	0	7

	Cessation[1] of Snow Pack	Last Spring Snowfall	First Fall Snow	Onset[2] of Snow Pack
1988	March 5	March 28	October 26	November 11
1987	March 26	April 9	October 18	December 11

WEATHER "SPELLS"[3,4]

	1988	1987
Longest Cool Spell	12 days Jan 30-Feb 10	19 days Aug 8-26
Longest Warm Spell	28 days May 15-June 12	40 days Jan 15-Feb 23
Longest Dry Spell	19 days Nov 18-Dec 6	22 days Sept 11-Oct 2
Longest Wet Spell	6 days Aug 18-Aug 23	5 days May 24-28

Note: An unusual weather phenomenon was a mud rainfall on June 10, 1988. Outdoor surfaces were covered by muddy splotches following this event.

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[1]First day on the first interval of at least 5 days duration in which snow cover is reduced to less than 1 cm depth.

[2]First day on the first interval of at least 5 days duration in which snow cover equals or exceeds 1 cm depth.

[3]Temperature "spells" are defined as a sequence of days when the daily mean temperature during the year in question is higher (warm spell) or lower (cold spell) than the long-term daily mean for the date in question.

[4]Precipitation "spells" are defined as the sequence of days with precipitation amounts greater than trace (wet spells) or precipitation amounts of trace or less (dry spells).

Table 28. Times of Sunrise at Saskatoon, 1988 (local time)

DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	9.16	8.49	7.53	6.42	5.37	4.52	4.50	5.28	6.18	7.07	8.02	8.53
2	9.16	8.48	7.51	6.39	5.35	4.51	4.51	5.29	6.20	7.09	8.04	8.54
3	9.16	8.46	7.49	6.37	5.33	4.50	4.52	5.31	6.21	7.11	8.05	8.56
4	9.15	8.44	7.46	6.35	5.31	4.50	4.52	5.32	6.23	7.13	8.07	8.57
5	9.15	8.43	7.44	6.33	5.29	4.49	4.53	5.34	6.25	7.14	8.09	8.58
6	9.15	8.41	7.42	6.30	5.27	4.48	4.54	5.36	6.26	7.16	8.11	9.00
7	9.15	8.39	7.40	6.28	5.25	4.48	4.55	5.37	6.28	7.18	8.13	9.01
8	9.14	8.37	7.37	6.26	5.24	4.47	4.56	5.39	6.29	7.19	8.14	9.02
9	9.14	8.36	7.35	6.23	5.22	4.47	4.57	5.40	6.31	7.21	8.16	9.03
10	9.13	8.34	7.33	6.21	5.20	4.46	4.58	5.42	6.33	7.23	8.18	9.04
11	9.13	8.32	7.31	6.19	5.19	4.46	4.59	5.44	6.34	7.24	8.20	9.05
12	9.12	8.30	7.28	6.17	5.17	4.46	5.00	5.45	6.36	7.26	8.22	9.06
13	9.11	8.28	7.26	6.14	5.15	4.45	5.01	5.47	6.38	7.28	8.23	9.07
14	9.10	8.26	7.24	6.12	5.14	4.45	5.03	5.48	6.39	7.30	8.25	9.08
15	9.10	8.24	7.21	6.10	5.12	4.45	5.04	5.50	6.41	7.31	8.27	9.09
16	9.09	8.22	7.19	6.08	5.11	4.45	5.05	5.52	6.43	7.33	8.29	9.10
17	9.08	8.20	7.17	6.06	5.09	4.45	5.06	5.53	6.44	7.35	8.30	9.11
18	9.07	8.18	7.14	6.03	5.08	4.45	5.08	5.55	6.46	7.37	8.32	9.12
19	9.06	8.16	7.12	6.01	5.06	4.45	5.09	5.57	6.48	7.38	8.34	9.12
20	9.05	8.14	7.10	5.59	5.05	4.45	5.10	5.58	6.49	7.40	8.36	9.13
21	9.04	8.12	7.07	5.57	5.04	4.45	5.12	6.00	6.51	7.42	8.37	9.13
22	9.03	8.10	7.05	5.55	5.02	4.46	5.13	6.02	6.52	7.44	8.39	9.14
23	9.02	8.08	7.03	5.53	5.01	4.46	5.14	6.03	6.54	7.46	8.41	9.14
24	9.00	8.06	7.00	5.51	5.00	4.46	5.16	6.05	6.56	7.47	8.42	9.15
25	8.59	8.04	6.58	5.49	4.59	4.47	5.17	6.06	6.57	7.49	8.44	9.15
26	8.58	8.02	6.56	5.47	4.58	4.47	5.19	6.08	6.59	7.51	8.45	9.15
27	8.56	8.00	6.53	5.45	4.57	4.48	5.20	6.10	7.01	7.53	8.47	9.16
28	8.55	7.57	6.51	5.43	4.55	4.48	5.22	6.11	7.02	7.55	8.49	9.16
29	8.54	7.55	6.49	5.41	4.54	4.49	5.23	6.13	7.04	7.56	8.50	9.16
30	8.52	0.00	6.46	5.39	4.54	4.49	5.25	6.15	7.06	7.58	8.51	9.16
31	8.51	0.00	6.44	0.00	4.53	0.00	5.26	6.16	0.00	8.00	0.00	9.16

Table 29. Times of Sunset at Saskatoon, 1988 (local time)

DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	17.04	17.51	18.45	19.40	20.31	21.17	21.31	20.58	19.56	18.46	17.39	16.58
2	17.05	17.53	18.47	19.41	20.33	21.18	21.31	20.57	19.53	18.43	17.37	16.58
3	17.06	17.55	18.49	19.43	20.34	21.19	21.30	20.55	19.51	18.41	17.35	16.57
4	17.07	17.57	18.51	19.45	20.36	21.20	21.30	20.53	19.49	18.39	17.33	16.57
5	17.08	17.59	18.52	19.47	20.38	21.21	21.29	20.52	19.46	18.36	17.32	16.56
6	17.09	18.01	18.54	19.48	20.39	21.22	21.29	20.50	19.44	18.34	17.30	16.56
7	17.11	18.02	18.56	19.50	20.41	21.23	21.28	20.48	19.42	18.32	17.28	16.55
8	17.12	18.04	18.58	19.52	20.43	21.24	21.28	20.46	19.40	18.29	17.26	16.55
9	17.13	18.06	19.00	19.53	20.44	21.25	21.27	20.44	19.37	18.27	17.25	16.55
10	17.15	18.08	19.01	19.55	20.46	21.26	21.26	20.42	19.35	18.25	17.23	16.55
11	17.16	18.10	19.03	19.57	20.48	21.27	21.25	20.40	19.33	18.23	17.22	16.54
12	17.17	18.12	19.05	19.59	20.49	21.27	21.24	20.38	19.30	18.20	17.20	16.54
13	17.19	18.14	19.07	20.00	20.51	21.28	21.24	20.36	19.28	18.18	17.19	16.54
14	17.20	18.16	19.08	20.02	20.52	21.29	21.23	20.34	19.25	18.16	17.17	16.54
15	17.22	18.17	19.10	20.04	20.54	21.29	21.22	20.32	19.23	18.14	17.16	16.54
16	17.23	18.19	19.12	20.05	20.55	21.30	21.21	20.30	19.21	18.12	17.14	16.54
17	17.25	18.21	19.14	20.07	20.57	21.30	21.19	20.28	19.18	18.09	17.13	16.55
18	17.27	18.23	19.15	20.09	20.59	21.30	21.18	20.26	19.16	18.07	17.12	16.55
19	17.28	18.25	19.17	20.11	21.00	21.31	21.17	20.24	19.14	18.05	17.10	16.55
20	17.30	18.27	19.19	20.12	21.01	21.31	21.16	20.22	19.11	18.03	17.09	16.56
21	17.32	18.29	19.21	20.14	21.03	21.31	21.15	20.20	19.09	18.01	17.08	16.56
22	17.33	18.31	19.22	20.16	21.04	21.32	21.13	20.18	19.07	17.59	17.07	16.57
23	17.35	18.32	19.24	20.17	21.06	21.32	21.12	20.16	19.04	17.57	17.06	16.57
24	17.37	18.34	19.26	20.19	21.07	21.32	21.11	20.13	19.02	17.55	17.05	16.58
25	17.39	18.36	19.28	20.21	21.09	21.32	21.09	20.11	19.00	17.53	17.04	16.58
26	17.40	18.38	19.29	20.23	21.10	21.32	21.08	20.09	18.57	17.51	17.03	16.59
27	17.42	18.40	19.31	20.24	21.11	21.32	21.06	20.07	18.55	17.49	17.02	17.00
28	17.44	18.42	19.33	20.26	21.12	21.32	21.05	20.05	18.53	17.47	17.01	17.01
29	17.46	18.43	19.34	20.28	21.14	21.32	21.03	20.02	18.50	17.45	17.00	17.02
30	17.48	0.00	19.36	20.29	21.15	21.31	21.02	20.00	18.48	17.43	16.59	17.02
31	17.49	0.00	19.38	0.00	21.16	0.00	21.00	19.58	0.00	17.41	0.00	17.03

Figure 1. Year 1988 Daily Temperature and Cumulative Precipitation

In order to present the maximum length of climatic record for the Saskatoon area, data from several sources have been pooled to produce the historic record shown in this figure. For data sources please refer to Footnotes for Climatic Tables, note 3. The seasons shown are defined on an astronomical basis.

YEAR 1988

DAILY TEMPERATURE AND ACCUMULATIVE PRECIPITATION

SASKATOON SRC (52°09'N, 106°36'W, 497m MSL)

WINTER | SPRING | SUMMER | AUTUMN

TEMPERATURE (°C)

ACCUMULATIVE PRECIPITATION (MM)

LEGEND

- TEMPERATURE
- EXTREME MAXIMUM TEMPERATURE - (YEARS)
- MEAN DAILY MAXIMUM TEMPERATURE - (YEARS)
- MEAN DAILY TEMPERATURE FOR THE (YEARS)
- MEAN DAILY MINIMUM TEMPERATURE - (YEARS)
- EXTREME MINIMUM TEMPERATURE - (YEARS)
- DAILY TEMPERATURE FOR CURRENT YEAR
- PRECIPITATION
- ALL TIME RECORD MAXIMUM YEARLY TOTAL PRECIPITATION - YEAR (xx)
- NORMAL YEARLY TOTAL PRECIPITATION FOR PERIOD (xx) - (yy)
- ALL TIME RECORD MINIMUM YEARLY TOTAL PRECIPITATION - YEAR (xx) (as of 5 May)
- CURRENT TOTAL PRECIPITATION

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER